

Appl. No. 10/764,516

Reply to Office Action of November 28, 2007

**REMARKS/ARGUMENTS****Status of Claims**

Claims 1 to 32 are currently pending in the application.

**Claim Amendments**

Claim 1 has been amended by replacing a semicolon with a colon at the end of the preamble.

Claim 17 has been amended by replacing "the computer readable medium comprising" with "the computer executable instructions comprising".

Claim 23 has been amended by replacing "optical" with "optical".

Claims 24, 30 and 31 have been amended to recite "A computer readable medium having computer executable instructions stored thereon for execution by a computer processor, for, when executed," wherein the underlined text has been added to the claim.

In claim 29, a redundant word "the" has been removed from the preamble.

**35 U.S.C. § 101 Rejections**

Claims 17 to 32 have been rejected under 35 U.S.C. § 101 as the claimed invention is alleged to be directed to non-statutory subject matter.

Claims 17, 24, 30 and 31 have been amended as described above, and on that basis Applicant submits that claims 17 to 32 comply with 35 U.S.C. § 101.

Applicant respectfully requests that the Examiner reconsider and withdraw the rejection.

**35 U.S.C. § 103(a) Rejections**

The law on obviousness under 35 U.S.C. 103 was recently addressed in *KSR Int'l v. Teleflex, Inc.*, No. 04-1350, slip op. at 14 (U.S., Apr. 30, 2007). Following this, examination guidelines were released by the USPTO on October 10, 2007 in regards to determining obviousness under 35 U.S.C. 103. According to these guidelines, the framework for the

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objective analysis for determining obviousness under 35 U.S.C. 103 is stated in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966). Obviousness is a question of law based on underlying factual inquiries. The factual inquiries enunciated by the Court are as follows:

- (1) Determining the scope and content of the prior art;
- (2) Ascertaining the differences between the claimed invention and the prior art; and
- (3) Resolving the level of ordinary skill in the pertinent art.

The Graham factors, including secondary considerations when present, are the controlling inquiries in any obviousness analysis. Once the findings of fact are articulated, Office personnel must provide an explanation to support an obviousness rejection under 35 U.S.C. 103.

According to KSR, for the Patent Office to properly combine references in support of an obviousness rejection, the Patent Office must identify a reason why a person of ordinary skill in the art would have sought to combine the respective teachings of the applied references.

Applicant's analysis below demonstrates that the Examiner has failed to properly conform to the aforementioned guidelines for a finding of obviousness under 35 U.S.C. 103.

**Claims 1 to 4, 8, 9, 11, 17 to 20, 24, 25 and 27**

The Examiner has rejected claims 1 to 4, 8, 9, 11, 17 to 20, 24, 25 and 27 under 35 U.S.C. 103(a) as being unpatentable over Iovanna et al. (U.S. Patent Application Publication 2006/0209785) in view of Nasrallah et al. ("NetCalc6 tutorial and a Preview of NetCalc7", hereinafter Nasrallah).

The independent claims are directed to co-modelling and analyzing simulated packet networks. For example, claim 1 is essentially directed to generating a basic packet capacity for a simulated packet network which includes a packet capacity for each link of the simulated packet network and generating a basic optical capacity for the simulated packet network including an optical capacity for each link of the simulated packet network. This enables design and/or analysis of networks based on desired/expected packet network topology, packet traffic, and optical network topology. The subject matter of the claims of the present application is directed

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for use with a simulated packet network and a simulated optical network over which the simulated packet network operates.

Iovanna et al. is directed to strategies for dynamically routing data packets for a respective source-destination node pair of a plurality of node pairs in an existing network. The routing of data packets in the existing network topology is based on using parameters that define predetermined critical network constraints, for example, the sum of available bandwidth of all the physical links in a logical link and/or the available bandwidth over single physical links (paragraph [0031]).

The claimed invention and the subject matter disclosed in Iovanna et al. are directed to different problems with different solutions. The claims of the present invention are directed to planning networks, while the subject matter of Iovanna et al. is directed to strategies for dynamically routing data packets in an existing network. Therefore, while the claims of the present invention may find use in designing and optimizing a network to accommodate traffic flows of expected or desired flows and in designing protection mechanisms for links in the network, the subject matter of Iovanna et al. is directed to implementing routing in an existing network that has links with pre-existing maximum capacity bandwidth and only uses available, i.e. unused bandwidth for such routing.

#### Missing Elements

The following is a discussion of how the cited references do not disclose all the elements of the rejected claim. While it may be considered that "the mere existence of differences between prior art and an invention does not establish the invention's non-obviousness", Office personnel must explain why the difference(s) between the prior art and the claimed invention would have been obvious to one skilled in the art (Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in *KSR international Co. v. Teleflex Inc.*, published in Federal Register Vol. 72, No. 195 October 10, 2007). As such, if elements from a claim are not disclosed by the combination of cited references and no valid reasoning is provided why the missing elements would be obvious, this may provide a strong basis for why a claim should not be rejected based on obviousness.

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With regard to claim 1, the Examiner asserts that Iovanna et al. discloses "A method for co-modelling a packet network and an optical network over which the packet network operates, the packet network representing a plurality of packet links between packet network nodes and the optical network representing a plurality of optical links between optical network nodes, the method comprising the steps of: generating a cost parameter comprising a cost value for each packet link based on packet network topology information and packet traffic information; and generating a basic optical capacity comprising a capacity value for each optical link based on optical network topology information and the basic packet capacity".

The Examiner has equated the limitation of "generating a basic packet capacity comprising a capacity value for each packet link" which is recited in claim 1 with "generating a cost parameter comprising a cost value for each packet link", as identified above. The Examiner has further stated that "generating a cost parameter comprising a cost value for each packet link" is disclosed in step 520 of Figure 5 of Iovanna et al., which discloses "assign weight to link". The weight is disclosed in Iovanna et al. in paragraph [0067] as for "indicating a cost of using the link for transport of the data packet, which cost refers to one or more first critical constraints or required resources". In a particular example, this may be the "total available link bandwidth". As further disclosed in paragraph [0083], in step 520, the weight is set with respect to a constraint based metric at the logical level and usually corresponds to aggregate information at the physical level, for example available bandwidth. The "available bandwidth is considered on the whole link, and is calculated as the sum of all of the spare bandwidths available over all of the wavelengths in all of the fibers that constitute the link". The definition of "capacity" according to Webster's Online Dictionary is "the maximum amount that can be contained or accommodated". Therefore, as Iovanna et al. is directed to available bandwidth, that is spare bandwidth, Iovanna et al. does not disclose "generating a basic packet capacity comprising a capacity value for each packet link", as the capacity value for each packet link recited in claim 1 is a maximum allowable bandwidth for each link.

Furthermore, Applicant submits that a weight value is not typically a capacity value per se, but is a normalized value, such as specifically disclosed in paragraph [0087] of Iovanna et al. As such, Applicant submits that the Examiner's equating of a cost value to the basic packet capacity recited in claim 1 is in error.

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In addition to the above comments, Applicant directs the Examiner's attention to the fact that claim 1 recites "a basic packet capacity comprising a capacity value for each packet link". This defines that the basic packet capacity includes capacities for each packet link. Iovanna et al. discloses assigning a weight for each link separately, as indicated by the Examiner, via the loop that allows weights to be assigned for other links, block 545 in Figure 5. Applicant submits that what Iovanna et al. discloses is each logical link having an assigned weight, not a value that includes the assigned weights of all of the links.

While Iovanna et al. may suggest that multiple weights may be combined for determining an optimized path through the network, Applicant submits that not all of the links in the network would be included when traversing the network from a start node to an end node as this would not result in an optimized path through the network. There is no indication of all the weights forming "a basic packet capacity", or "a cost parameter comprising a cost value of each packet link" as alleged by the Examiner. Iovanna et al. does not perform generating a basic packet capacity comprising a capacity value for each packet link based on packet network topology information and packet traffic information, but discloses assigning separate cost parameters, which may be based on the sum of available bandwidth of the physical links, to each logical link to aid in determining an optimal path through the network.

With regard to the limitation of "generating a basic optical capacity comprising a capacity value for each optical link based on optical network topology information and the basic packet capacity" the Examiner appears to be equating the expression "a basic optical capacity" in the claim with "the availability of bandwidth at the wavelength level" disclosed in paragraph [0071], the expression "a capacity value for each optical link" in the claim with the loop that allows weights to be assigned for other links, i.e. block 545 in Figure 5, and the expression "based on optical network topology information and the basic packet capacity" with the disclosure in paragraph [0069].

Paragraph [0069] states that "At step 525, information specifically regarding the physical level is taken into account checking for availability at the physical level of an actual physical link able to meet the requirements of a second critical resource or second constraint, which may be an equivalent, or be influenced by, the first resource or constraint taken into account at the



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logical level" (emphasis added). Therefore, this appears to indicate the second constraint is dependent upon the first constraint.

However, in paragraph [0070], it is disclosed that "the second critical resource may also be an independent constraint which is critical to the correct operation of the optical layer" (emphasis added) and paragraph [0071] explicitly states "In this case it is assumed that the second constraint is the availability of bandwidth at the wavelength level" (emphasis added). Therefore, Applicant submits that generating a second constraint which is "the availability of bandwidth at the wavelength level" disclosed at paragraph [0071] is not equivalent to "generating a basic optical capacity comprising a capacity value for each optical link based on optical network topology information and the basic packet capacity" because Iovanna et al. clearly states for this example, the second constraint is an independent constraint. Since the second constraint is not dependent on the first constraint, Iovanna et al. does not disclose "generating a basic optical capacity comprising a capacity value for each optical link based on optical network topology information and the basic packet capacity". The Examiner has alleged that Iovanna et al. discloses the particular limitation, but has cited elements of Iovanna et al. that disclose two separate and contradictory conditions, one in which the second critical condition is independent of the first critical condition and one where it is dependent upon the first critical condition. Applicant submits that such selection of elements is inappropriate, as at least one of the conditions, the one being more heavily relied upon by the Examiner is contradictory to the other.

In addition, for at least the same reasons discussed above that Iovanna et al. does not disclose "a basic packet capacity comprising a capacity value for each packet link", Applicant submits that Iovanna et al. does not disclose "a basic optical capacity comprising a capacity value for each optical link". That is, Iovanna et al. does not disclose an optical capacity that includes the capacities of all of the links and only pertains to using available bandwidth on physical links, not maximum bandwidths that define the optical capacity on respective links.

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With regard to claim 1, at the middle of page 4, the Examiner concedes that Iovanna et al. does not disclose particular features of the claim, but alleges that Nasrallah discloses these features.

Nasrallah is directed to a tutorial that includes a review of basic principles used in two-layer and three-layer wide area network design. As discussed above, Iovanna et al. is directed to strategies for dynamically routing data packets for a respective source-destination node pair of a plurality of node pairs in an actual network.

The Examiner alleges on page 4 that "At the time the invention was made, it would have been obvious to one of ordinary skill in the art to employ simulated versions of the networks of Iovanna. One of ordinary skill in the art would have been motivated to do this to test the routing strategies and algorithms of Iovanna (paragraph [0028] before deploying them into actual networks". Applicant submits that it is not only for the "networks of Iovanna" that the Examiner is citing Iovanna et al., the Examiner is alleging that Iovanna et al. discloses the two distinct method steps recited in claim 1. Therefore, employing simulated versions of the networks of Iovanna et al. does not result in the subject matter recited in claim 1. Furthermore, the routing strategies and algorithms of Iovanna et al. disclosed in paragraph [0028] are used for dynamic routing in an existing network. The steps of the routing strategies and algorithms of Iovanna et al. are not the same as those recited in claim 1, for at least the reasons discussed above. Therefore, even if one skilled in the art would test the routing strategies and algorithms of Iovanna et al. on a simulated network of the type disclosed by Nasrallah, the result would not be what is recited in claim 1. Clearly, the combination of the subject matter of Iovanna et al. and Nasrallah is different than what is recited in claim 1.

Claim 8 recites similar subject matter to claim 1, along with an additional limitation of performing analysis on the simulated packet network and the simulated optical network over which the simulated packet network operates. For the same reasons as discussed above regarding claim 1, Applicant submits that the combination of Iovanna et al. and Nasrallah is not directed to the same subject matter as the present application, and does not disclose performing method steps that are at all related to what is recited in claim 8.

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With regard to the additional limitation, the Examiner alleges that Iovanna discloses “performing analysis on the simulated packet network and the simulated optical network over which the simulated packet network operates” in the form of block 565 of Figure 5, the results illustrated in Figures 6-9, analysis being implied by “state information” in paragraphs [0062]-[0063], the use of the expression “analysis” in paragraph [0066] and the expression “check” in paragraph [0071].

Block 565 of Figure 5 is a step in a method of determining an optimal path between two nodes of a network. Paragraph [0080] of Iovanna et al. discloses “If more than one link is available, a criterion is applied at step 565 to select the most appropriate physical link, as will be better detailed hereafter, otherwise the only available one is picked”. Applicant submits that the step of block 565 is totally unrelated to performing analysis on a simulated network, it is merely directed to a manner of selecting an appropriate physical link for routing a data packet in an actual network.

Applicant submits what is illustrated in Figures 6-9, is not “performing analysis on the simulated packet network and the simulated optical network over which the simulated packet network operates” as recited in claim 8. The results illustrated in Figures 6-9 are comparisons of performance using different criteria in the choice of physical links [0044]. The figures compare results achieved by a method of the proposed invention of Iovanna et al. to other known ways to perform a similar activity. This is not something that is performed as part of the standard operation of Iovanna et al, but is a comparison in the patent to show the “improvement” provided by Iovanna et al.

With regard to the use of “state information” in paragraphs [0062]-[0063], Applicant submits that this is merely information about the network, status of the link, network topology, connectivity of nodes, etc, and does not pertain to analysis being performed on the network.

With regard to “analysis” in paragraph [0066], this term is being used to describe the operations disclosed in Iovanna et al. that the Examiner is equating to the two “generating” limitations recited prior to the “analyzing” limitation in claim 8. As the two “generating” limitations are distinct and separate from the “analyzing” limitation, it is improper for the



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Examiner to equate the same elements in Iovanna et al. for both the "generating" limitations and the "analyzing" limitation.

With regard to "check" in paragraph [0071], this term again is part of the disclosure in Iovanna et al. that the Examiner is equating to the "generating" limitations in claim 8. Applicant submits that it is improper for the Examiner to equate the same elements in Iovanna et al. for both the "generating" limitations and the "analyzing" limitations.

Claims 2 to 4 are dependent upon claim 1. Claims 9 and 11 are dependent upon claim 8. Applicant does not concede that the additional features recited in these dependent claims are found in the combination of Iovanna et al. and Nasrallah as set out by the Examiner. However, it is respectfully submitted that it is not necessary to address these issues at this time in view of the strong case for patentability of independent claims 1 or 8. Claims 17 to 20, 24, 25 and 27 recite similar subject matter to claims 1-4, 8, 9 and 11 in the form of computer readable medium claims, and are likewise submitted to patentably distinguish over Iovanna et al. and Nasrallah.

Applicant submits that there are differences between what is disclosed in the combination of Iovanna et al. and Nasrallah and what is recited in the rejected claims of the present application, in particular, the combination of Iovanna et al. and Nasrallah does not teach all the limitations of the rejected claims. Furthermore, the Examiner has not provided a suitable reason why the missing limitations would be obvious to one skilled in the art. Therefore, Applicant submits that there are differences between the cited art and the rejected claims of the present application that demonstrate that the rejected claims of the present application patentably distinguish over the combination of references.

#### Reason to Combine

Once the scope of the prior art is ascertained, the content of the prior art must be properly combined. An obviousness inquiry requires review of a number of factors, including the background knowledge possessed by a person having ordinary skill in the art, to determine whether there was an apparent reason to combine the elements of the prior art in the fashion claimed by the present invention. For the Patent Office to combine references in support of an obviousness rejection, the Patent Office must identify a reason why a person of ordinary skill in

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the art would have combined the references *KSR Int'l v. Teleflex, Inc.*, No. 04-1350, slip op. at 14 (U.S., Apr. 30, 2007), Id. at 15. Even if the Patent Office is able to articulate and support a suggestion to combine the references, it is impermissible to pick and choose elements from the prior art while using the application as a template.

As discussed above, Applicant submits that one skilled in the art would not combine the subject matter of Iovanna et al. and Nasrallah as simply simulating the methods of Iovanna et al. on a simulated network in a manner disclosed by Nasrallah, would not result in the claimed invention. Iovanna et al. is directed to routing strategies for packets, so even if this was simulated before implementation on an existing network, which is the intended purpose of Iovanna et al. this does not result in the claimed subject matter of the present invention, for the reasons discussed above. Applicant further submits that one skilled in the art would not consider combining the cited references as they are directed to different purposes, routing on existing networks and modelling of networks to accommodate expected traffic flows.

In addition, the Examiner's motivation for combining Iovanna et al. with Nasrallah, set out on page 4, is tied to his view that Iovanna *et al.* teaches the limitations recited in claim 1. As detailed above, this is an incorrect interpretation of Iovanna *et al.*, and as such this affects the Examiner's reason to combine argument.

Similar arguments apply to the other rejected claims.

On the basis of the above, Applicant respectfully submits the Examiner has not provided a suitable reason why a person of ordinary skill in the art would have combined the cited references. On these basis the Examiner is respectfully requested to withdraw the rejection of claims 1 to 4, 8, 9, 11, 17 to 20, 24, 25 and 27 under 35 U.S.C. 103(a).

**Claims 5 to 7, 10, 12 to 16, 21 to 23, 26 and 28 to 32**

The Examiner has rejected claims 5 to 7, 10, 12 to 16, 21 to 23, 26 and 28 to 32 under 35 U.S.C. 103(a) as being unpatentable over Iovanna et al. in view of Nasrallah and one or more of Applicant's admitted prior art, Doverspike et al. (U.S. Patent Application Publication 2004/0107382) and non-patent reference Ghani et al. (On IP-over WDM Integration).

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It is respectfully submitted that the Examiner has failed to satisfy the requirements for a finding of obviousness recently articulated by the U.S. Supreme Court in its decision in *KSR Int'l v. Teleflex, Inc.*, No. 04-1350, slip op. at 14 (U.S., Apr. 30, 2007). Accordingly, as a matter of law, the rejection of the claims cannot stand and must be rescinded.

Independent claims 14 and 15 are directed to methods for analyzing survivability of a simulated packet transport network. As described on page 3, lines 22-25 of the present application, "A survivability analysis on the network allows a user to simulate a failure of any single optical link in the simulated packet transport network and examine how this affects the traffic carrying requirements of the network". Applicant submits that the combination of Iovanna et al. and Nasrallah is not directed to analyzing survivability of a simulated packet network, as alleged by the Examiner. Iovanna et al. in particular is unrelated to what is disclosed in the present invention and recited in claims 14 and 15. Applicant submits that Iovanna et al. and Nasrallah do not in combination disclose all the limitations of claims 14 and 15 that are alleged by the Examiner to be disclosed by Iovanna et al. and Nasrallah.

Applicant submits that none of the cited references teach the limitations lacking in Iovanna et al. and Nasrallah that are alleged by the Examiner to be disclosed by Iovanna et al. and Nasrallah. Therefore Applicant submits that not all of the limitations are disclosed by the combination of cited references.

Claim 16 is dependent upon claim 14. Claims 30 to 32 recite similar subject matter to claims 14 to 16. Applicant submits claims 14 to 16 and 30 to 32 patentably distinguish over Iovanna et al., Nasrallah and the other cited references.

Claims 5 to 7 are dependent upon claim 1. Claims 10, 12 and 13 are dependent upon claim 8. Claims 21 to 23, 26, 28 and 29 are computer readable medium claims that are similar in subject matter to claims 5 to 7, 10, 12 and 13. Applicant submits that the combination of Iovanna et al., Nasrallah and the cited references do not disclose all the limitations of claims 1 and 8 alleged to be disclosed by the Examiner.

Applicant submits that there are differences between what is disclosed in the combination of Iovanna et al. and Nasrallah and what is recited in the rejected claims of the present

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application, in particular, the combination of Iovanna et al. and Nasrallah does not teach all the limitations of the rejected claims. Furthermore, the Examiner has not provided a suitable reason why the missing limitations would be obvious to one skilled in the art. Therefore, Applicant submits that there are differences between the cited art and the rejected claims of the present application that demonstrate that the rejected claims of the present application patentably distinguish over the combination of references.

Furthermore, in view of the subject matter disclosed in Iovanna et al. being unrelated to what is disclosed and claimed in the present application, and the subject matter of Iovanna et al. and Nasrallah being directed to different endeavours, Applicant submits that one skilled in the art would not consider combining Iovanna et al. and Nasrallah when contemplating the subject matter of the present application. Therefore, Applicant does not concede that the Examiner has met the burden of identifying a reason why a person of ordinary skill in the art would have sought to combine the respective teachings of the Iovanna et al., Nasrallah and one or more of the cited references, as required by KSR.

On these basis the Examiner is respectfully requested to withdraw the rejection of 5 to 7, 10, 12 to 16, 21 to 23, 26 and 28 to 32 under 35 U.S.C. 103(a).

### **Response to Arguments**

On pages 14 to 16 of the Office Action the Examiner responds to arguments submitted in the Office Action response filed on September 14, 2007.

Regarding the Examiner's response to the first point, Applicant submits that, as discussed above, the loop used in assigning weights to each link in Figure 5 is not equal to the basic packet capacity comprising a capacity for each packet link recited in independent claims 1 and 8. With regard to the issue of generating versus utilizing, Applicant does not totally agree with the Examiner's suggestion that an object must be generated before it is utilized, in the context of the claims. In particular, there is no suggestion or disclosure in Iovanna et al. that capacity values of packet links and optical links are generated in the methods disclosed by Iovanna et al. Iovanna et al. has links with fixed capacity, as an existing network, with variable available bandwidths.

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Regarding the Examiner's response to the second point, Applicant submits that, as discussed above, the fact that Nasrallah may be directed to simulated networks, does not mean that one skilled in the art would combine Nasrallah with Iovanna et al. Nasrallah may teach simulating networks, but this does not change the issue that Iovanna et al. does not teach the limitations of the rejected claims.

Regarding the Examiner's response to the third point, Applicant submits that, for the reasons discussed above, application of a criterion at step 565 is not analysis of the result of what is generated previous to step 565, but is simply application of a criterion for selecting a most appropriate physical link.

In view of the foregoing, early favorable consideration of this application is earnestly solicited.

Respectfully submitted,

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